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(21) International Application Number: PCT/CA93/00266 (22) International Filing Date: 23 June 1993 (23.06.93) (30) Priority data: 2,072,383 25 June 1992 (25.06.92) CA 08/034,777 19 March 1993 (19.03.93) US (71) Applicant: 498775 ONTARIO LIMITED, doing business as INTERNATIONAL PLASTICARD [CA/CA]; 7195 Tranmere Drive, Unit 5, Mississauga, Ontario L5S 1N4 (CA). (72) Inventors: PEREZ, Juan ; 351 Fleetwood Crescent, Brampton, Ontario L6T 2E7 (US). YIM, Joan, Marilyn ; 4122 Bridle Path Trail, Mississauga, Ontario L5L 3E9 (US).		(74) Agent: JOHNSTON, N., Malcolm, S.; Malcolm Johnston & Associates, Suite 505, 133 Richmond Street West, Toronto, Ontario M5H 2L3 (CA). (81) Designated States: AU, BB, BG, BR, BY, CZ, FI, HU, JP, KP, KR, KZ, LK, MG, MN, MW, NO, NZ, PL, RO, RU, SD, SK, UA, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>With amended claims.</i>
(54) Title: SILK SCREEN TACTILE PRINTS AND PROCESS		
<div style="text-align: center;"> </div>		
(57) Abstract <p>Production of a tactile print using an improved silk screen process which provides a product with raised imprinted surfaces of sufficient local definition to permit tactile "reading" of the print. In the case of a surface imprinted with Braille patterns, the process provides a low cost touch-readable imprint of acceptable clarity and depth for use by Braille readers. The process uses known silk screen procedures using a screen ranging in mesh per square inch from 60 to 100, in combination with high viscosity "ink", which may in some instances be non-pigmented. The process includes the provision of underside spacers, and may also utilize air pressure differential across the thickness of the screen to facilitate flow of the "ink", together with controlled drying rates.</p>		

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- 1 -

SILK SCREEN TACTILE PRINTS AND PROCESS05 TECHNICAL FIELD

This invention is directed to a printing process, and in particular to a silk screen process for producing tactile prints of high definition, such as Braille characters, and to the printed product.

BACKGROUND ART

The silk screen printing process is well known, and of ancient antecedents. The ink or other pigment to be deposited upon a surface being imprinted is caused to flow downwardly through a fine mesh screen, and deposited upon a printing surface or substrate located beneath the screen. The desired pattern to be printed is initially imposed upon the screen, with adjacent non-print areas being rendered impervious to ink flow, such that passage of a wave of the printing media across the screen results in selective deposition of the ink through the screen onto the surface below. Owing to the utilization by the process of photographic technology in the preparation of the screens, it is possible to achieve an accuracy of printing that enables precise, multicoloured printing, the printed composite image being formed by successive screen overlays, each screen being used with a selected colour, to achieve precise colour combinations. The

- 2 -

nature of the inks thus used do not provide a pattern that is effectively traceable by touch, being therefore
05 effectively tactile-insensitive.

Braille patterns, as used by sightless or semi-sighted people comprise a series of "characters" each comprising up to six raised dots in patterned arrangement,
10 ment, to form indicia.

These dots are embossed and raised from the reading surface so as to present a tactile pattern that, with training, can be "read" through the finger tips.
15 The existing methods of "printing" Braille require the use of embossable media such as paper, cardboard, fort and the like, where a raised impression of circular dots of suitable definition and height may be impressed, to form the Braille indicia. The process requires the use
20 of special machinery and is limited in the types of material that may be thus embossed.

Use of Braille requires the user to be trained in its "reading", a capability possessed at most by about
25 forty percent of sight handicapped people.

DISCLOSURE OF THE INVENTION

The present invention provides a process for

- 3 -

05 silk screen printing an upstanding print of sufficient height and definition to permit "reading" thereof by touch. In the case of Braille indicia, the present invention provides an imprinted surface wherein the imprinted dots are of sufficient height and lateral dimension to permit ready reading by trained Braille "readers" of the indicia thus formed.

10

In the subject process a screen is prepared with a desired printing pattern by an existing screen preparation process.

15

An underlying spacing medium is provided. In its simplest form, as in the case of printing Braille, this spacing media may comprise a series of thin strips laterally offset from the screened printing pattern, to effect spacing of the screen underface a predetermined distance above the substrata surface being imprinted.

20

The "ink" to be used should be of the highest "body" and lowest fluidity compatible with the process. This facilitates achieving the desired shape and height of deposition, while the rate of slump is minimized until drying of the print becomes effective. While the use of pigment therewith, as in the case of normal ink, facilitates the carrying out of the process, in the case of Braille printed matter use of such pigmentation may not

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- 4 -

be necessary.

05 In applying the present process, the high viscosity of the deposited medium facilitates the use of a deep "flood", while use of a squeegee of suitable hardness, ranging from medium hard to hard promotes the effectiveness of deposition.

10

 In general, the screen spacing media, in the form of spacer strips extend longitudinally beneath the screen, lying in generally parallel relation with the path of movement of the squeegee, and the directional
15 flow path of the flood.

 In addition to the foregoing, the application of an air pressure differential across the thickness of the screen further facilitates the transfer of the fluid
20 medium, through the mesh of the screen and onto the substrate surface being imprinted. In a preferred embodiment the air pressure differential is applied by suction.

 A contemplated procedure for providing the required 5 to 10 thou of spacing media comprises spraying
25 the reverse face of the patterned silk screen with a suitably thick spacer coating, the opposing passage of air through the printing pattern precluding deposition of spacer material adjacent the pattern, and then drying the

- 5 -

spacer coating.

05 The tactile print capability of the present invention makes possible the widespread production of tactile printed material more suited to the needs of sight-handicapped people not trained in reading Braille.

10 The present invention further provides an article having a print face, the print face having a substantially smooth reference surface, and at least one non-embossed, tactile-sensed substantially rigid raised pattern thereon, to enable tactile reading of the
15 pattern.

 The aforesaid raised pattern may be differently coloured from the reference surface, to permit visual access to the pattern. It will be understood that the
20 article may comprise a card, such as a greeting card.

 It will be further understood that the print face need not be planar, but may comprise outwardly convex surfaces, over which the printing screen can be
25 readily rocked, in carrying out the process.

 The raised pattern according to the invention does not require to be limited to dots.

- 6 -

BRIEF DESCRIPTION OF THE DRAWINGS

05 Certain embodiments of the invention are described by way of illustration, without limitation of the invention thereto, wherein;

 Figure 1 is a schematic plan view of a printing
10 frame and screen for imprinting Braille-like characters, in accordance with the present invention;

 Figure 2 shows a tactile readable imprinted
 pattern resulting from the Figure 1 arrangement;

15

 Figure 3 is a section view taken at 3-3 of Figure 1; and

 Figure 4 is a lateral view of the Figure 1 arrangement.
20

BEST MODE OF CARRYING OUT THE INVENTION

 Reference is first made to Figures 1 and 3,
25 with reference also to Figure 2. In order to produce an imprinted dot pattern 20 as that shown in Figure 2, a silk screen 10 is first prepared wherein all of the sur-

- 7 -

face of the screen is covered with a photosensitive emulsion, which is dried. The screen 10 is the photographically exposed to a negative of the desired image (i.e. in accordance with Figure 2).

The series of dots of Figure 2, representing the desired image is then washed off from the exposed screen 10, leaving a series of circular imprints 12 over an otherwise still-emulsioned screen surface 13.

Spacer means 12¹, illustrated schematically in Figure 1 as a series of dashed lines and in Figure 3 as spacer pieces having a section of some 0.04 inches to 0.05 inches wide by 0.005 inches to 0.010 inches (i.e. 5 to 10 thou) thick, are secured to the underside of screen 10, adjacent the pattern of columns of indicia.

A pool 14 of a dense "ink" is deposited at one end of the screen 10, within the confines of the supporting frame 16, by which the screen 10 is supported, to form a "flood".

A squeegee 18 (See Figure 4) is used to locally depress the screen 10 in front of the flood (pool 14) of ink, causing the flood to flow leftwardly across the surface of screen 10 in following relation with the squeegee 18 as it transverses the screen leftwardly, thereby fill-

- 8 -

ing the imprinted interstices of the imprints 12, and
permitting limited downward flow of the ink through and
05 past the screen 10. The application of vacuum, by way of
suction box 22 produces air downflow as indicated by the
downward arrows, and promotes the deposition of "dots" 23
onto the underlying print substrate 24. This may be of
paper, cardboard or almost any other type of surface to
10 which the "ink" will adhere.

The printed substrate 24 is then removed and
subject to rapid drying, such as with a heat lamp.

15 INDUSTRIAL APPLICABILITY

The presently disclosed process provides a
printed product having a significantly raised imprint of
adequate prominence to permit tactile reading, and makes
the printing of Braille and other tactile matter acces-
sible to silk screen apparatus and techniques.

- 9 -

What is Claimed:

05 1. The method of imprinting a substrata with raised indicia having sufficient prominence to permit digit-wise tactile reading therefrom, comprising the steps of:

10 providing a mesh screen having a sufficiently large mesh size to permit the passage of viscous deposition medium therethrough; impermeably coating a surface of said screen, and leaving a desired pattern of permeable interstices thereacross; locating substrata support
15 means beneath said screen in spaced relation therefrom, having said substrata in supported relation thereon; interposing spacing media of predetermined thickness between the underside of said screen and said substrate; depositing a pool of said deposition medium on said
20 screen; displacing said pool across said screen, for general distribution and for localized passage of said medium through said interstices and into said substrata in upstanding relation thereon; and

25 drying said upstanding medium to provide prominent tactile indicia.

2. The method as set forth in Claim 1, including

- 10 -

the step of applying air pressure differential to said screen, to enhance passage of said medium into and
05 through said interstices of said screen.

3. The method as set forth in Claim 1, said sub-
strata support means comprising separator strips of pre-
determined thickness, said interposing step including
10 orientation of said strips in the direction of displacement of said pool across said screen.

4. The method as set forth in Claim 1, said step
of displacing said pool comprising displacing said screen
15 to cause flow of said deposition medium across said screen surface.

5. The method as set forth in Claim 1, said screen
displacing step comprising depressing said screen local-
20 ly, in a localized zone adjacent said pool, and moving said localized depressed zone away from said pool at a rate substantially equal to the rate of lateral flow of said pool.

25 6. The method as set forth in Claim 1, said mesh size lying in the range 50 to 100 mesh per square inch.

7. The method as set forth in Claim 1, said spacing media having a thickness in the range 0.005 inches to 0.010 inches.

- 11 -

8. Apparatus for depositing raised indicia upon a supporting substrata, comprising silk screen means having a mesh size in the range 50 to 100 mesh per square inch, some of said mesh being unobstructed; spacer means located below said silk screen means having a thickness in the range 0.005 to 0.010 inches; substrata support means located below said silk screen means; substrata located upon said support means, for imprinting through said unobstructed mesh; pool supply means to deposit a flood of high viscosity indicia imprinting media upon said silk screen means; and squeegee means for depressing said silk screen means adjacent said flood, in use to enable passage of said flood in flowing relation across said silk screen means, for penetration of said imprinting media through and past said unobstructed mesh, in adhering relation with said substrata.

9. An article having a print face, said print face having a substantially smooth reference surface, and at least one non-embossed, tactile-sensed, substantially rigid raised pattern thereon, to enable tactile reading of said pattern.

10. The article as set forth in Claim 9, at least a portion of said raised pattern being differently coloured from said reference surface, to permit visual access to the pattern.

- 12 -

11. The article as set forth in Claim 9, comprising
a card of predetermined shape, said pattern comprising a
05 communication.

12. The article as set forth in Claim 11, said
raised pattern being distinctively coloured.

AMENDED CLAIMS

[received by the International Bureau on 19 November 1993 (19.11.93);
original claims 6 and 9 cancelled; claims 7-12 renumbered as
claims 6-10 other claims unchanged (4 pages)]

What is Claimed:

- 05 1. The method of imprinting a substrata (24) with
 raised indicia (23) having sufficient prominence to per-
 mit digit-wise tactile reading therefrom, comprising the
 steps of:
- 10 providing a mesh screen (10); impermeably coat-
 ing a surface (24) of said screen, and leaving a desired
 pattern (20) of permeable interstices thereacross; locat-
 ing substrate support means (16) beneath said screen in
 spaced relation therefrom, positioning said substrate in
15 supported relation thereon; depositing a pool (14) of
 said deposition medium on said screen (10); displacing
 said pool across said screen, for general distribution
 and for localized passage of said medium through said
 interstices and into said substrata in upstanding rela-
20 tion thereon; characterized by said mesh screen (10) hav-
 ing a mesh size lying in the range 50 to 100 mesh per
 square inch to permit the passage of viscous deposition
 medium therethrough;
- 25 and drying said upstanding medium to provide
 prominent tactile indicia (23).
2. The method as set forth in Claim 1, further
 characterized by the step of applying air pressure

- 14 -

05 differential to said screen, to enhance said passage of
said medium into and through said interstices of said
screen.

3. The method as set forth in Claim 1, further
characterized by the step of interposing spacing media
(12¹) of predetermined thickness between said screen
10 (10) and said substrate (24); said spacing media (12¹)
comprising separator strips (12¹) of predetermined
thickness, said interposing step including orienting said
strips (12¹) in the direction of displacement of said
pool (14) across said screen (10).

15

4. The method as set forth in Claim 1, said step
of displacing said pool comprising displacing said screen
to cause flow of said deposition medium across said
screen surface.

20

5. The method as set forth in Claim 1, said screen
displacing step comprising depressing said screen local-
ly, in a localized zone adjacent said pool (14), and
moving said localized depressed zone away from said pool
25 at a rate substantially equal to the rate of lateral flow
of said pool (14).

6. The method as set forth in Claim 3, said spac-
ing media (12¹) having a thickness in the range 0.005
inches to 0.010 inches.

- 15 -

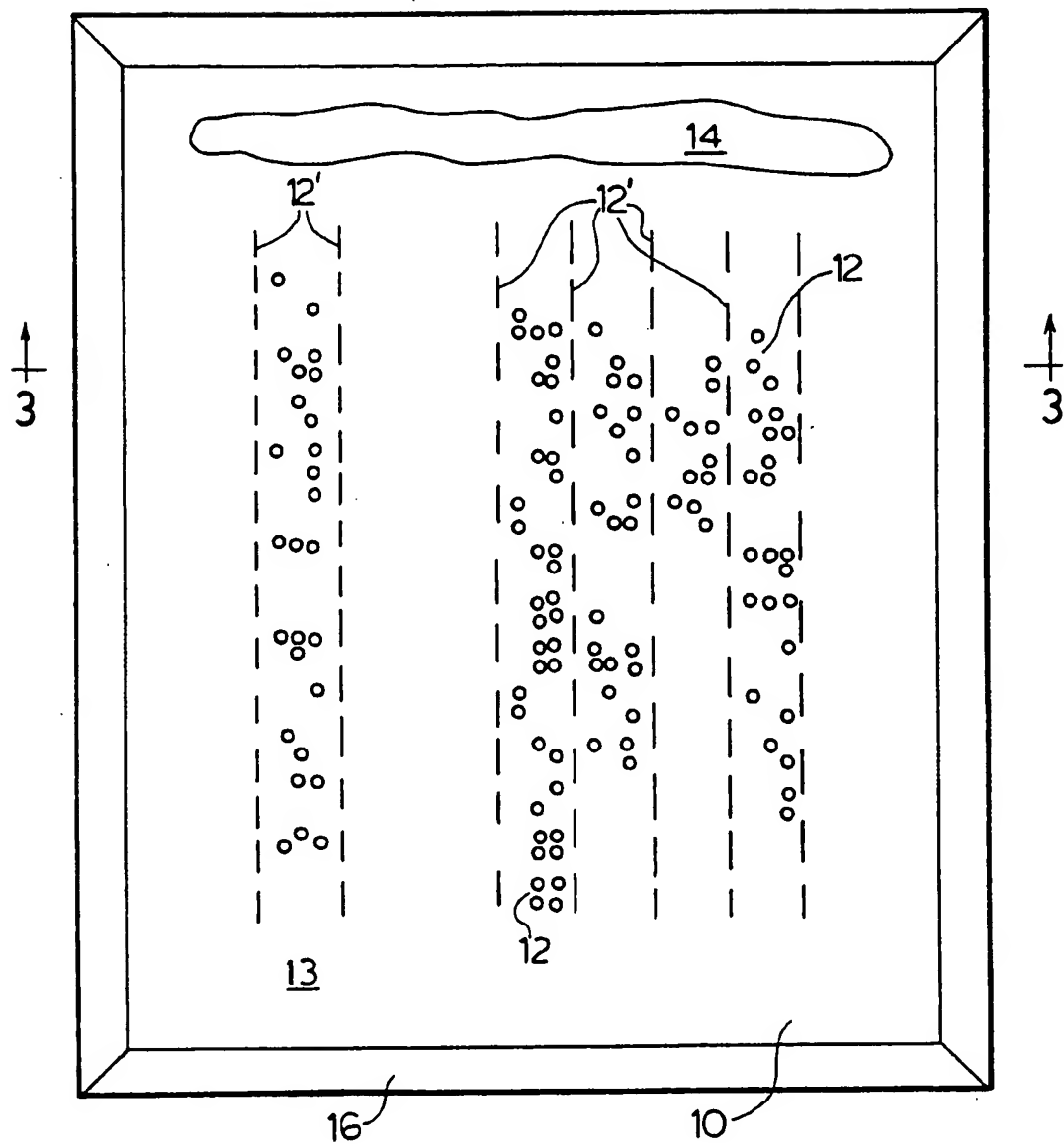
7. Apparatus for depositing raised indicia upon a supporting substrata, comprising silk screen means (10) having some of the mesh thereof being unobstructed; substrata support means (16) located below said silk screen means (10); substrata (24) located upon said support means (16), for imprinting through said unobstructed mesh; pool supply means to deposit a flood (14) of high viscosity indicia imprinting media upon said silk screen means (24); and squeegee means (18) for depressing said silk screen means (10) adjacent said flood (14), in use to enable passage of said flood (14) in flowing relation across said silk screen means (10), for penetration of said imprinting media through and past said unobstructed mesh, as a raised pattern (23) in adhering relation with said substrata (24), characterized by said silk screen (10), having a mesh size in the range 50 to 100 mesh per square inch, and by spacer means (12¹) located below said silk screen means (10), having a thickness in the range 0.005 to 0.010 inches.

8. The article as set forth in Claim 7, at least a portion of said raised indicia (23) being differently coloured from said supporting strata (24) to permit visual access to the pattern.

- 16 -

9. The article as set forth in Claim 8, comprising
a card of predetermined shape, said pattern comprising a
05 communication.

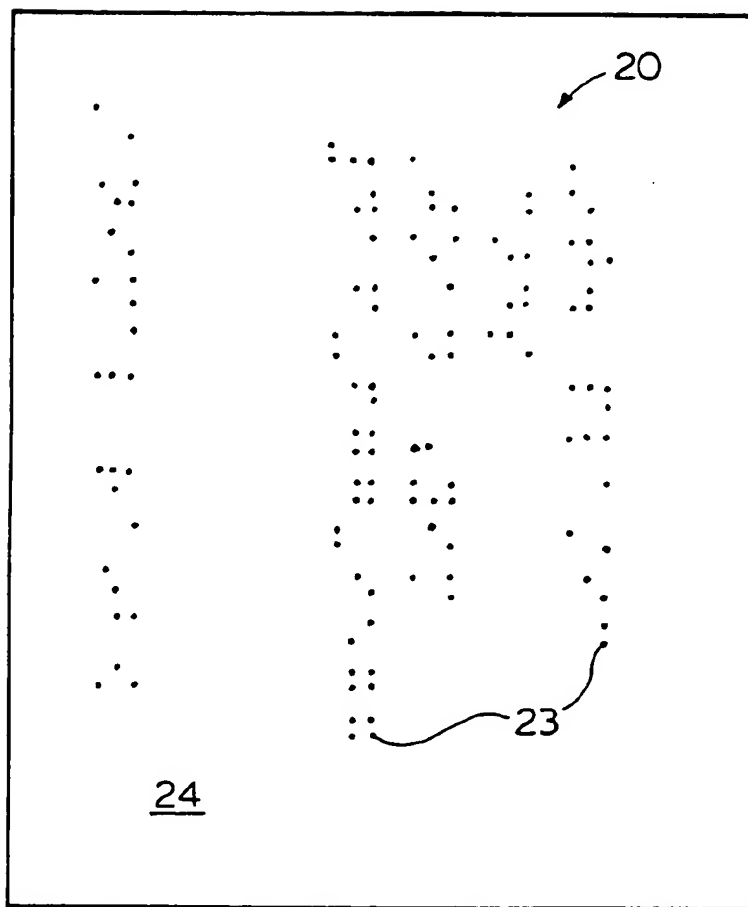
10. The article as set forth in Claim 9, said
raised pattern being distinctively coloured.

1/3
FIG.1.

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2/3

FIG. 2.



SUBSTITUTE SHEET

3/3

FIG.3.

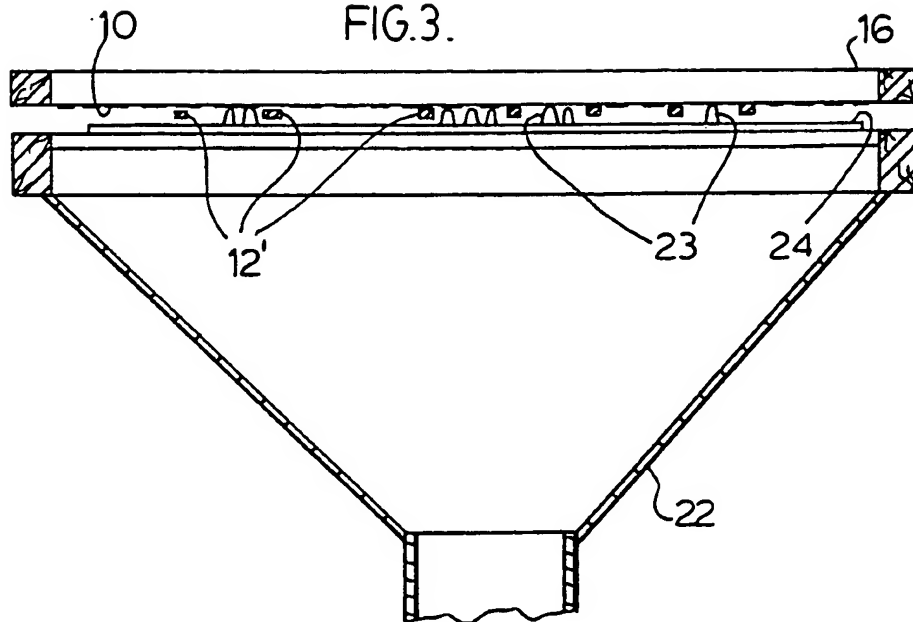
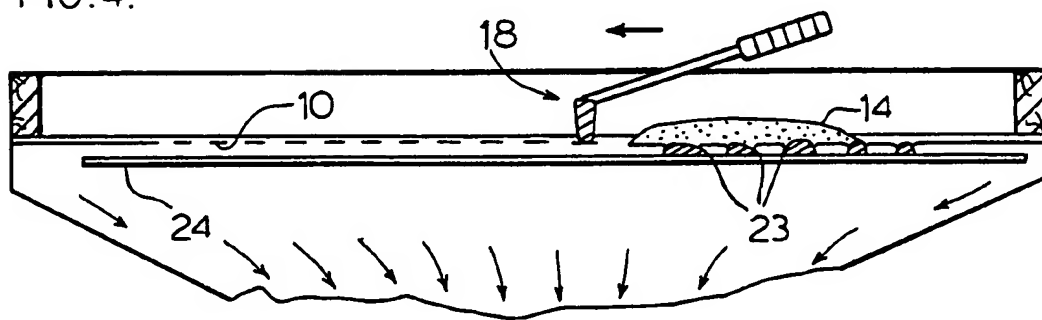


FIG.4.



SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

PCT/CA 93/00266

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 B41M3/16; B41M1/12; G09B21/00		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	B41M ; G09B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	WO,A,8 810 193 (H.RIEBL) 29 December 1988 see page 2, line 1 - line 30; claims 1,4,6; figures 1,2 ---	1,8-12
X	WO,A,8 707 221 (SERIPRINT INTERNATIONAL AS) 3 December 1987 see page 2, line 35 - page 4, line 25; claim 1 ---	1,8-12
X	WO,A,8 302 176 (D. VAN ROEKEL) 23 June 1983 see page 1, line 31 - page 2, line 13 see page 4, line 37 - page 6, line 10; claims 1,9 -----	1,8-10
<p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
08 SEPTEMBER 1993	22.09.93	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	BACON A.J. <i>A.J. Bacon</i>	

Form PCT/ISA/210 (second sheet) (January 1985)

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

CA 9300266
SA 76074

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-8810193	29-12-88	DE-A- 3720702 EP-A- 0365570	05-01-89 02-05-90
WO-A-8707221	03-12-87	None	
WO-A-8302176	23-06-83	NL-A- 8105657 EP-A- 0096687 JP-T- 58502111	01-07-83 28-12-83 08-12-83

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